AMENDMENTS TO THE CLAIMS

1 – 24. (Cancelled)

25. (New) A switching element comprising:

an ion conductor capable of conducting metal ions therein;

a first electrode and a second electrode which are disposed in contact with said ion conductor; and

a third electrode disposed in contact with said ion conductor and including said metal ions;

wherein an interelectrode distance L1 between said first electrode and said second electrode, an interelectrode distance L2 between said first electrode and said third electrode, and an interelectrode distance L3 between said second electrode and said third electrode satisfy the condition according to the expression:

$L1 < L2 \times 2$ and $L1 < L3 \times 2$.

26. (New) The switching element according to claim 25, wherein the interelectrode distance between said first electrode and said second electrode is 0.5 μm or less.

27. (New) A switching element disposed on a substrate covered with an insulating film or an insulating substrate, comprising:

an ion conductor capable of conducting metal ions therein;

a first electrode and a second electrode which are disposed in contact with said ion conductor; and

a third electrode disposed in contact with said ion conductor and including a metal dissolvable into said ion conductor based on an electrochemical reaction;

wherein an interelectrode distance L1 between said first electrode and said second electrode, an interelectrode distance L2 between said first electrode and said third electrode, and an interelectrode distance L3 between said second electrode and said third electrode satisfy the condition according to the expression:

$L1 < L2 \times 2$ and $L1 < L3 \times 2$.

28. (New) The switching element according to claim 27, wherein:

said first electrode and said second electrode are disposed on said substrate in spaced-apart relation to each other, and the interelectrode distance between said first electrode and said second electrode is 0.5 μm or less;

said ion conductor is disposed to cover said first electrode and said second electrode; and

said third electrode is disposed on said ion conductor.

29. (New) The switching element according to claim 27, wherein:

said third electrode is disposed on said substrate;

said ion conductor is disposed on said third electrode; and

said first electrode and said second electrode are disposed on said ion conductor in spaced-apart relation to each other, and the interelectrode distance between said first electrode and said second electrode is 0.5 μm or less.

30. (New) The switching element according to claim 27, wherein:

said first electrode and said third electrode are disposed on said substrate;

said ion conductor is disposed on said first electrode and said third electrode; and

said second electrode is disposed on said ion conductor, and the interelectrode distance between said first electrode and said second electrode is equal to or on the order of a film thickness of said ion conductor.

31. (New) The switching element according to claim 25, wherein an electrical characteristic between said first electrode and said second electrode is controlled by applying a voltage to said third electrode.

32. (New) The switching element according to claim 27, wherein an electrical characteristic between said first electrode and said second electrode is controlled by applying a voltage to said third electrode.

33. (New) The switching element according to claim 31, wherein said electrical characteristic represents electric conductivity.

34. (New) The switching element according to claim 32, wherein said electrical characteristic represents electric conductivity.

35. (New) The switching element according to claim 25, wherein:

said first electrode and said second electrode are electrically interconnected to bring the switching element into an on state by applying a voltage, which is positive with respect to at least one of said first electrode and said second electrode, to said third electrode; and

said first electrode and said second electrode are insulated from each other to bring the switching element into an off state by applying a voltage, which is negative with respect to at least one of said first electrode and said second electrode, to said third electrode.

36. (New) The switching element according to claim 27, wherein:

said first electrode and said second electrode are electrically interconnected to bring the switching element into an on state by applying a voltage, which is positive with respect to at least one of said first electrode and said second electrode, to said third electrode; and

said first electrode and said second electrode are insulated from each other to bring the switching element into an off state by applying a voltage, which is negative with respect to at least one of said first electrode and said second electrode, to said third electrode.

37. (New) The switching element according to claim 25, wherein said second electrode includes a metal dissolvable into said ion conductor based on an electrochemical reaction.

38. (New) The switching element according to claim 27, wherein said second electrode includes a metal dissolvable into said ion conductor based on an electrochemical reaction.

39. (New) The switching element according to claim 37, wherein:

said first electrode and said second electrode are electrically interconnected to bring the switching element into an on state by either applying a voltage, which is positive with respect to said first electrode, to said second electrode, or applying a voltage, which is positive with respect to at least one of said first electrode and said second electrode, to said third electrode; and

said first electrode and said second electrode are insulated from each other to bring the switching element into an off state by either applying a voltage, which is negative with respect to said first electrode, to said second electrode, or applying a voltage, which is negative with respect to at least one of said first electrode and said second electrode, to said third electrode.

40. (New) The switching element according to claim 38, wherein:

said first electrode and said second electrode are electrically interconnected to bring the switching element into an on state by either applying a voltage, which is positive with respect to said first electrode, to said second electrode, or applying a voltage, which is positive with respect to at least one of said first electrode and said second electrode, to said third electrode; and

said first electrode and said second electrode are insulated from each other to bring the switching element into an off state by either applying a voltage, which is negative with respect to said first electrode, to said second electrode, or applying a voltage, which is negative with respect to at least one of said first electrode and said second electrode, to said third electrode.

41. (New) The switching element according to claim 25, wherein at least one of said first electrode, said second electrode, and said third electrode has a pointed portion on a surface thereof held in contact with said ion conductor.

42. (New) The switching element according to claim 27, wherein at least one of said first electrode, said second electrode, and said third electrode has a pointed portion on a surface thereof held in contact with said ion conductor.

43. (New) The switching element according to claim 25, wherein said ion conductor comprises either a calcogenide material including an element belonging to the group 6B of the periodic table, or metal ionic glass, or metal ionic amorphous semiconductor.

44. (New) The switching element according to claim 27, wherein said ion conductor comprises either a calcogenide material including an element belonging to the group 6B of the periodic table, or metal ionic glass, or metal ionic amorphous semiconductor.

45. (New) The switching element according to claim 25, wherein:

said ion conductor and said third electrode are made of either copper sulfide and copper, respectively, or of silver sulfide and silver, respectively; and

portions of said first electrode and said second electrode which are held in contact with said ion conductor are made of either a metal such as platinum, aluminum, gold, titanium, tungsten, vanadium, niobium, tantalum, chromium, or molybdenum, a nitride of the metal, or a silicide of the metal, or a combination thereof.

46. (New) The switching element according to claim 27, wherein:

said ion conductor and said third electrode are made of either copper sulfide and copper, respectively, or of silver sulfide and silver, respectively; and

portions of said first electrode and said second electrode which are held in contact with said ion conductor are made of either a metal such as platinum, aluminum, gold, titanium, tungsten, vanadium, niobium, tantalum, chromium, or molybdenum, a nitride of the metal, or a silicide of the metal, or a combination thereof.

47. (New) The switching element according to claim 37, wherein:

said ion conductor and said third and second electrodes are made of either copper sulfide and copper, respectively, or of silver sulfide and silver, respectively; and

a portion of said first electrode which is held in contact with said ion conductor is made of either a metal such as platinum, aluminum, gold, titanium, tungsten, vanadium, niobium, tantalum, chromium, or molybdenum, a nitride of the metal, or a silicide of the metal, or a combination thereof.

48. (New) The switching element according to claim 38, wherein:

said ion conductor and said third and second electrodes are made of either copper sulfide and copper, respectively, or of silver sulfide and silver, respectively; and

a portion of said first electrode which is held in contact with said ion conductor is made of either a metal such as platinum, aluminum, gold, titanium, tungsten, vanadium, niobium, tantalum, chromium, or molybdenum, a nitride of the metal, or a silicide of the metal, or a combination thereof.

49. (New) The switching element according to claim 25, wherein said ion conductor comprises an electrolytic solution.

50. (New) The switching element according to claim 27, wherein said ion conductor comprises an electrolytic solution.

51. (New) The method of driving a switching element according to claim 31, comprising the step of:

controlling said electrical characteristic based on the voltage applied to said third electrode and/or a period of time for which the voltage is applied to said third electrode.

52. (New) The method of driving a switching element according to claim 32, comprising the step of:

controlling said electrical characteristic based on the voltage applied to said third electrode and/or a period of time for which the voltage is applied to said third electrode.

53. (New) The method of driving a switching element according to claim 35, comprising the steps of:

selectively bringing said switching element into said on state and said off state depending on the polarity of the voltage applied to said third electrode; and

holding said switching element in either said on state or said off state even if no voltage is applied to said third electrode.

54. (New) The method of driving a switching element according to claim 36, comprising the steps of:

selectively bringing said switching element into said on state and said off state depending on the polarity of the voltage applied to said third electrode; and

holding said switching element in either said on state or said off state even if no voltage is applied to said third electrode.

55. (New) The method of driving a switching element according to claim 39, comprising the steps of:

selectively bringing said switching element into said on state and said off state depending on the polarity of the voltage applied to said third electrode; and

holding said switching element in either said on state or said off state even if no voltage is applied to said third electrode.

56. (New) The method of driving a switching element according to claim 40, comprising the steps of:

selectively bringing said switching element into said on state and said off state depending on the polarity of the voltage applied to said third electrode; and

holding said switching element in either said on state or said off state even if no voltage is applied to said third electrode.

57. (New) The method of driving a switching element according to claim 35, comprising the steps of:

when said switching element is caused to transit between said on state and said off state, measuring the conductivity between said first electrode and said second electrode; and

controlling the voltage applied to said third electrode based on a change in the conductivity.

58. (New) The method of driving a switching element according to claim 36, comprising the steps of:

when said switching element is caused to transit between said on state and said off state, measuring the conductivity between said first electrode and said second electrode; and

controlling the voltage applied to said third electrode based on a change in the conductivity.

59. (New) The method of driving a switching element according to claim 39, comprising the steps of:

when said switching element is caused to transit between said on state and said off state, measuring the conductivity between said first electrode and said second electrode; and

controlling the voltage applied to said third electrode based on a change in the conductivity.

60. (New) The method of driving a switching element according to claim 40, comprising the steps of:

when said switching element is caused to transit between said on state and said off state, measuring the conductivity between said first electrode and said second electrode; and

controlling the voltage applied to said third electrode based on a change in the conductivity.

61. (New) The rewritable logic integrated circuit incorporating a switching element according to claim 31 as a programming switch.

62. (New) The rewritable logic integrated circuit incorporating a switching element according to claim 32 as a programming switch.

63. (New) The memory device having memory cells each comprising a switching element according to claim 31 and either a MOS transistor or a diode.

64. (New) The memory device having memory cells each comprising a switching element according to claim 32 and either a MOS transistor or a diode.

65. (New) The memory device according to claim 63, wherein:

said memory cell comprises a MOS transistor;

said switching element has said second electrode connected to the drain electrode of said MOS transistor, said first electrode connected to a first bit line, and said third electrode connected to a first word line; and

said MOS transistor has a source electrode connected to a second bit line different from said first bit line and a gate electrode connected to a second word line different from said first word line.

66. (New) A memory device according to claim 64, wherein:

said memory cell comprises a MOS transistor;

said switching element has said second electrode connected to the drain electrode of said MOS transistor, said first electrode connected to a first bit line, and said third electrode connected to a first word line; and

said MOS transistor has a source electrode connected to a second bit line different from said first bit line and a gate electrode connected to a second word line different from said first word line.